REMARKS

In view of the following discussion, the Applicants submit that none of the claims now pending in the application is made obvious under the provisions of 35 U.S.C. § 103. Thus, the Applicants believe that all of these claims are now in allowable form.

I. REJECTION OF CLAIMS 1-9, 11, 14, 15, 25-28, 32-38, 40 AND 43-45 UNDER 35 U.S.C. § 103

A. Claims 1-7, 11, 14, 15, 25 and 26

The Examiner has rejected claims 1-7, 11, 14, 15, 25 and 26 under 35 U.S.C. §103(a) as made obvious by the Suzuki patent (US patent 6,567,427, issued on May 20, 2003, hereinafter "Suzuki"). In response, the Applicants have amended independent claims 1 and 25, from which claims 2-9, 11, 14, 15 and 26 depend, in order to more clearly recite aspects of the present invention.

Particularly, the Examiner's attention is directed to the fact that Suzuki fails to disclose or suggest the novel invention of encoding each component of a video image sequence in accordance with a plurality of dimensions to form a plurality of bitstreams, such that the plurality of bitstreams forms a partial order having as its base a common bitstream comprising components that are common to each of the plurality of bitstreams, where the base bitstream encodes a first version of the video image sequence, as claimed in Applicants' amended independent claims 1 and 25.

In contrast, Suzuki teaches, at best, a scene descriptor that describes the spatial configuration for a predetermined two- or three-dimensional scene (*see*, Suzuki, column 16, lines 58-60: "The scene descriptor SD is composed of a group of descriptions called nodes", emphasis added). Thus, the scene descriptor is not equivalent to a bitstream that encodes a video image sequence.

Notably, Applicants' invention positively claims the step of encoding each component of a video image sequence in accordance with a plurality of selected dimensions to form a plurality of bitstreams, such that the plurality of bitstreams forms a

partial order wherein each point of the partial order represents a unique valid combination of components and dimensions for encoding the video image sequence, and a base of the partial order represents a base bitstream comprising components that are common to each of the plurality of bitstreams. This base bitstream encodes a first version (*e.g.*, a generic or lowest-quality version) of the video image sequence. Thus, the base bitstream is a "viewable" bitstream that is displayable on a user device as a most basic version of the video image sequence. The user device may select different "enhancement" bitstreams in addition to the base bitstream in order to display different components of the video image sequence at different or improved qualities. (*e.g.*, by selecting a given point in the partial order), so that the reconstructed video image sequence comprises the best quality video image sequence that may be processed by the user device in accordance with the user's preferences (*e.g.*, the background may be deconstructed according to frame rate, and the foreground may be deconstructed according to resolution and so on). The scene descriptor taught by Suzuki, in contrast, only describes where to position a video object in an image or sequence of images. The scene descriptor must be demultiplexed with bitstreams and information related thereto to produce a displayable image or image sequence. Thus, the scene descriptor does not encode a video image sequence.

Moreover, the MPEG-4 standard described in the background of Suzuki also does not teach, show or suggest the creation of a base bitstream as a base of a partial order, where the base bitstream encodes a first version of a video image sequence. The feature of MPEG-4 referenced by the Examiner describes, at best, an ordered set of "improvement layers" for a video object. This is not equivalent to a partial order as claimed by the Applicants. The MPEG-4 standard described in Suzuki provides only one choice of parent improvement node in an ordering of improvements. As described above, the invention claimed by the Applicants provides a plurality of improvement "nodes" (*e.g.*, points in the partial order), wherein each point of the partial order represents a unique valid combination of components and dimensions for encoding the video image sequence.

Suzuki clearly fails to disclose or suggest the novel invention of encoding each component of a video image sequence in accordance with a plurality of dimensions to form a plurality of bitstreams, such that the plurality of bitstreams forms a partial order having as its base a common bitstream comprising components that are common to each of the plurality of bitstreams where the base bitstream encodes a first version of the video image sequence as claimed in Applicants' amended independent claims 1 and 25. Specifically, Applicants' claims 1 and 25, as amended, positively recite:

> 1. A method of deconstructing video comprising:
> separating a video image sequence into two or more components;
> selecting a plurality of dimensions, where each dimension represents a characteristic of the video image sequence; and
> encoding each component of the video image sequence in accordance with the selected dimensions to form a plurality of bitstreams, such that the plurality of bitstreams forms a partial order wherein each point of the partial order represents a unique valid combination of components and dimensions for encoding the video image sequence, and a base of the partial order represents a base bitstream comprising components that are common to each of said plurality of bitstreams, said base bitstream encoding a first version of said video image sequence. (Emphasis added)

> 25. Apparatus for producing deconstructed video comprising:
> a video component extractor for extracting at least one second image sequence from a first image sequence, where said at least one second image sequence represents a component of said first video image sequence;
> an encoding dimension selector for selecting a plurality of dimensions to use to encode said at least one second image sequence; and
> a dimension-based encoder, coupled to said encoding dimension selector, for encoding the at least one second video image sequence into a plurality of bitstreams, such that the plurality of bitstreams forms a partial order wherein each point of the partial order represents a unique valid combination of dimensions for encoding the first image sequence and the at least one second image sequence, and a base of the partial order represents a base bitstream comprising components that are common to each of said plurality of bitstreams, said base bitstream encoding a first version of said video image sequence. (Emphasis added)

Applicants' invention is directed to a method and apparatus for generating,

distributing and reconstructing deconstructed video over a network. In contrast, conventional systems that distribute deconstructed video through communications networks often encode video sequences into several independent data streams, wherein each data stream represents an entire video sequence having a different level of image quality. An end user or decoder device then selects one appropriate data stream to match user equipment capabilities. Such methods typically require a priori user familiarity with device capabilities in order to manually select the appropriate data stream. Moreover, the transmission of multiple data streams containing full representations of video sequences consumes a tremendous amount of bandwidth and storage space.

The present invention provides a method for encoding video sequences in which a video sequence is divided into two or more constituent components (*e.g.*, foreground/background, moving objects/stationary objects, text/versus moving video, face/remaining video, fixed regions/other regions, infrared geometric shapes/other regions, annotated regions/other regions, graphics/non-graphics, etc.). The components of the video sequence are then deconstructed into multiple dimensions (*e.g.*, resolution, frame rate, display type, etc) by generating a partial order representation of the deconstructed elements for each component of the video. The method thereby produces a common base bitstream calculated from common components of the individual dimensional base bitstreams (and forming the base of the partial order), plus a plurality of separately encoded additional or augmentation bitstreams, which collectively form the partial order/lattice structure. The base bitstream is a "viewable" bitstream that encodes a generic or lowest-quality version of the video sequence (*e.g.*, a version of the video sequence that is viewable on the greatest number of display devices). Intersection points of the bitstreams represent "improved" video sequences including combinations of the base bitstream with one or more of the augmentation bitstreams. Thus, by performing multidimensional video deconstruction, any two or more subsets of bitstreams may be combined to produce an optimal video sequence for a particular user device.

In contrast, Suzuki only teaches image signal multiplexing and demultiplexing

apparatuses. The multiplexing apparatus is adapted for multiplexing image signals for transmission through a transmission medium by selecting spatial configuration information for describing a predetermined object and then selecting bitstreams constituting the predetermined object from among a plurality of layers of bitstreams having different qualities. The selected spatial configuration information and the selected bitstreams are then multiplexed with additional information and output to the transmission medium, *e.g.*, as a single bitstream. The demultiplexing apparatus receives the single bitstream and separates the single bitstream into the spatial configuration information, the plurality of layers of bitstreams and the additional information and processes this separated information in order to reconstruct the original image signal.

Thus, Suzuki fails to disclose or suggest the novel invention of encoding each component of a video image sequence in accordance with a plurality of dimensions to form a plurality of bitstreams, such that the plurality of bitstreams forms a partial order having as its base a common bitstream comprising components that are common to each of the plurality of bitstreams where the base bitstream encodes a first version of the video image sequence as claimed in Applicants' amended independent claims 1 and 25. Therefore, the Applicants submit that, at least for the reasons presented above, independent claims 1 and 25, as amended, fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Dependent claims 2-7, 11, 14, 15 and 26 depend from claims 1 and 25, and recite additional features therefore. As such, and for at least the same reasons set forth above, the Applicants submit that claims 2-7, 11, 14, 15 and 26 are not made obvious by the teachings of Suzuki. Therefore, the Applicants submit that dependent claims 2-7, 11, 14, 15 and 26 also fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

B. Claims 8 and 9

The Examiner has rejected claims 8 and 9 under 35 U.S.C. §103(a) as made obvious by Suzuki in view of the Chaddha patent (U.S. Patent No. 5,621,660, issued

April 15, 1997, hereinafter "Chaddha"). In response, the Applicants have amended independent claim 1, from which claims 8 and 9 depend, as discussed above to more clearly recite aspects of the invention.

The Examiner's attention is directed to the fact that Chaddha, like Suzuki, does not teach that a plurality of bitstreams representing different dimensions with which components of a video image signal are encoded can be arranged in a partial order (*e.g.*, a lattice) having a common bitstream (*e.g.*, comprising components common to all of the plurality of bitstreams) as its base, where the base bitstream encodes a first version of the video image sequence, as claimed in Applicants' amended independent claim 1, which has been recited above.

Chaddha only teaches a video delivery system that provides end-to-end encoding such that a single embedded data stream is produced containing several video sequence layers. Accordingly, the Applicants submit that, at least for the reasons presented above, amended independent claim 1 fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

Dependent claims 8 and 9 depend from claim 1, and recite additional features therefore. As such, and for at least same reasons set forth above, the Applicants submit that claims 8 and 9 are not made obvious by the teachings of Suzuki in view of Chaddha. Therefore, the Applicants submit that dependent claims 8 and 9 also fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

C. Claim 27

The Examiner rejected claim 27 under 35 U.S.C. §103(a) as being unpatentable over Suzuki in view the Burt patent (U.S. Patent No. 5,063,603, issued November 5, 1991, hereinafter "Burt"). In response, the Applicants have amended independent claim 25, from which claim 27 depends, to more clearly recite aspects of the invention.

The Examiner's attention is directed to the fact that Burt, like Suzuki, fails to disclose or suggest that a plurality of bitstreams representing different dimensions with which components of a video image signal are encoded can be arranged in a partial order (*e.g.*, a lattice) having a common bitstream (*e.g.*, comprising components

common to all of the plurality of bitstreams) as its base, where the base bitstream encodes a first version of the video image sequence, as positively claimed by the Applicants in independent claim 25.

Burt only teaches a method for object recognition, *e.g.*, for recognizing or locating an individual within a series of video frames. For example, a time series of successive, relatively high-resolution image frames, is examined in order to recognize the identity of a specific individual or object in the time series. The frames may then be examined at various resolutions to detect whether any earlier occurring frames include a group of attributes or image features possessed by an image of the specific individual or object. The locations of detected image features are then stored and used in subsequent higher-resolution frames to direct examination only to the image region of the detected features, *e.g.*, in order to verify the detection of the image features and/or to detect additional features or attributes of the image of the specific individual or object. Locations of stationary objects may also be stored in order to distinguish moving objects or images. By repeating this process for successive frames, the accumulated detected features can be used to recognize the detected image region as an image of the specific individual or object. Accordingly, the Applicants submit that, at least for the reasons presented above, amended independent claim 25 fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

Dependent claim 27 depends from claim 25, and recites additional features thereof. As such and for at least the same reasons set forth above, the Applicants submit that claim 27 is also not made obvious by the teachings of Suzuki in view of Burt. Therefore, the Applicants submit that claim 27 also fully satisfies the requirements of 35 U.S.C. § 103 and is patentable thereunder.

D. Claim 28

The Examiner rejected claim 28 under 35 U.S.C. §103(a) as being unpatentable over Suzuki in view of the Wine patent (U.S. Patent No. 6,477,201, issued November 5, 2002, hereinafter "Wine"). In response, the Applicants have amended independent claim 25, from which claim 28 depends, as discussed above to more clearly recite

aspects of the invention.

The Examiner's attention is directed to the fact that Wine, like Suzuki, also does not teach that a plurality of bitstreams representing different dimensions with which components of a video image signal are encoded can be arranged in a partial order (*e.g.*, a lattice) having a common bitstream (*e.g.*, comprising components common to all of the plurality of bitstreams) as its base, where the base bitstream encodes a first version of the video image sequence, as recited by independent claim 25.

Wine only teaches a method for selective enhancement or degradation of information within a video image sequence. For example, regions of particular interest within an image may be encoded with a higher resolution than regions of less significance, in order to emphasize the regions of interest. Accordingly, independent claim 25 is not made obvious by the teachings of Suzuki in view of Wine.

Dependent claim 28 depends from claim 25 and recites additional features therefor. As such and for at least the same reasons set forth above, the Applicants submit that claim 28 is also not made obvious by the teachings of Suzuki in view of Wine. Therefore, the Applicants submit that claim 28 also fully satisfies the requirements of 35 U.S.C. § 103 and is patentable thereunder.

E. Claims 32-38, 40 and 43-45

The Examiner has rejected claims 32-38, 40 and 43-45 under 35 U.S.C. §103(a) as being unpatentable over Suzuki in view of the Haskell patent (US patent 6,233,356, issued on May 15, 2001, hereinafter Haskell). In response, the Applicants have amended independent claim 32, from which claims 33-38, 40 and 43-45 depend, to more clearly recite aspects of the present invention.

The Examiner's attention is directed to the fact that Haskell, like Suzuki, fails to disclose or suggest the novel invention of encoding each component of a video image sequence in accordance with a plurality of dimensions to form a plurality of bitstreams, such that the plurality of bitstreams forms a partial order having as its base a common bitstream comprising components that are common to each of the plurality of bitstreams, where the base bitstream encodes a first version of the video image

sequence, as claimed in Applicants' amended independent claim 32. Specifically, Applicants' claim 32, as amended, positively recites:

> 32. A computer readable medium containing software that, when executed by one or more general purpose computers operating as network nodes, causes the computer or computers to perform a method comprising:
> separating a video image sequence into two or more components;
> selecting a plurality of dimensions, where each dimension represents a characteristic of the video image sequence; and
> encoding each component of the video image sequence in accordance with the selected dimensions to form a plurality of bitstreams, such that the plurality of bitstreams forms a partial order wherein each point of the partial order represents a unique valid combination of components and dimensions for encoding the video image sequence, and a base of the partial order represents a base bitstream comprising components that are common to each of said plurality of bitstreams, said base bitstream encoding a first version of said video image sequence. (Emphasis added)

Suzuki has been discussed above.

Haskell teaches a video coding system that produces a single embedded data stream containing several video object layers. In particular, Haskell teaches that an original video sequence is encoded into a data stream comprising a first or "base" layer containing coded video object data of a lowest quality (*e.g.*, temporal or spatial quality), and one or more "enhancement" layers containing enhancement data that, when combined with the base layer video, display increasingly higher-quality video sequences. These multiple video object layers are then organized into a single data stream by a multiplexer, and the data stream is sent to a decoder for display (*see*, Haskell, column 4, lines 37-39: "The MUX 600 organizes the coded video object data ... into a data stream ..."). The decoder extracts one or more of the video object data layers to display, in accordance with the decoder's own operating parameters.

Haskell thus does not bridge the gap in the teachings of Suzuki. Therefore, the Applicants submit that, at least for the reasons presented above, independent claim 32, as amended, fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

Dependent claims 33-38, 40 and 43-45 depend from claim 32 and recite

additional features therefor. As such, and for at least the same reasons set forth above, the Applicants submit that claims 33-38, 40 and 43-45 are not made obvious by the teachings of Suzuki in view of Haskell. Therefore, the Applicants submit that dependent claims 33-38, 40 and 43-45 also fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

II. CONCLUSION

Thus, the Applicants submit that all of the presented claims now fully satisfy the requirements of 35 U.S.C. §103. Consequently, the Applicants believe that all of these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the maintenance of the final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong, Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

1/5/06
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